Coltness High School

S2 Science

# Electricity Notes

#### **Electric Circuits**

An electric circuit is a path that current flows through. If there are any breaks in the circuit, the current won't flow.

### Series Circuits

In a series circuit the current flows from one component to the next. There is only one path for the electric current.

If one of the bulbs in this circuit is broken, there will be a gap in the circuit and current won't flow so all of the bulbs will go out.



## Parallel Circuits

In a parallel circuit, there is more than one loop or branch for the current to flow through. If one bulb goes out, the current can still flow through the other branches, so the other bulbs stay lit.



## <u>Electric Current</u>

Electric Current is the movement of charges around a circuit. We use an Ammeter to measure the current in Amperes (A) or Amps.

To measure the current the ammeter must be part of the circuit so that the current flows through it.



The higher the current the brighter the bulbs will be.

In a <u>series circuit</u> the current is the same everywhere in the circuit.



In a <u>parallel circuit</u> the current from the battery splits up at each branch.



#### <u>Voltage</u>

The voltage is a measure of the energy of the charges. The energy is supplied by a battery or the mains supply. We use a voltmeter to measure voltage in Volts (V).

To measure the voltage the voltmeter must be placed across (in parallel with) the component.

In a <u>series circuit</u> the voltage of the battery is shared between all of the other components



In a <u>parallel circuit</u> the voltage is the same across each branch of the circuit.



### Resistance

Resistance is the opposition to the flow of current in a circuit. The bigger the resistance, the smaller the current. The smaller the resistance, the bigger the current.

Materials with a low resistance are good conductors of electricity.

Materials with a very high resistance are not good conductors and are called insulators.

The resistance of something depends on its length, its thickness and the kind of material it's made of.

The longer the wire, the bigger its resistance. The thinner the wire the bigger its resistance

Resistance is measured in ohms ( $\Omega$ ). We use an ohmmeter to measure resistance.



## <u>Safety</u>

When current flows through a wire it gets hot . If there is a fault, too much current can flow and may cause a fire. To stop this from happening we use a fuse.

A fuse is a wire that melts at low temperatures. When it melts it leaves a gap in the circuit and the current flow stops.

#### **Electromagnets**

When a current flows through a wire there is a magnetic effect around the wire. We can make this effect stronger by increasing the current, wrapping the wire around iron and increasing the number of loops (turns) of wire.



Electromagnets are useful because they can be switched on and off. They are used on cranes to lift scrap metal and 'maglev' trains use electromagnets to allow the train to 'float' above the railway track.